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Monitoring retinal function in neovascular maculopathy using multifocal electroretinography - early and long-term correlation with clinical findings.

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PURPOSE: To objectively investigate and longitudinally monitor retinal function in patients with choroidal neovascularization (CNV) due to exudative age-related macular degeneration (AMD) and myopia using multifocal electroretinography (mfERG). **METHODS:** Patients with classic and occult subfoveal CNV secondary either to AMD or to myopia were enrolled in the study. The mfERGs were performed at the beginning of the study and every 3 months subsequently during a follow-up period of 15 months. In addition, standardized visual acuity testing, ophthalmologic examinations, color fundus photographs and fluorescein angiography were performed. The mfERG records were derived with the VERIS-System (Electro-Diagnostic Imaging, San Mateo, Calif., USA); 103 locations within the central 50 degrees in diameter were stimulated concurrently by means of the m-sequence technique. Fixation stability was monitored throughout the recording session with an infrared eye monitoring system (VERIS Refractor/Camera unit). The first-order response component was extracted for each stimulated retinal location. The response densities of the first-order kernel were evaluated as a function of eccentricity from the center (ring 1) to the periphery of the stimulated area (ring 6). The results were compared to those derived from age-matched normal control groups. For each patient mfERG responses measured on follow-up visits were compared to each other to evaluate and monitor changes in retinal function. These changes were tested for correlation with those observed in other clinical and electroretinographic findings. Statistical analysis was performed using the Pearson coefficient. **RESULTS:** Subfoveal neovascular maculopathy was associated with a reduction in response density most prominent within the central 5 degrees over the

area affected by CNV detected either at the beginning of the study or at the follow-up recordings. During the follow-up period patients 1 and 4 showed stabilization or a slight increase in response densities over the neovascular lesion-complex and a corresponding stabilization or slight increase in visual acuity accompanied by a decrease in the activity of the neovascular lesion as determined by fluorescein angiography. Patient 2 revealed an increase in response density correlating with an increase in visual acuity and decrease in lesion size. In the contralateral eye of this patient the response density dropped in the area of new subfoveal CNV. In patient 3 continuous progression of the disease was documented by fluorescein angiography and visual acuity. It correlated well with a continuous decrease in retinal response densities during the follow-up. **CONCLUSIONS:** Objective monitoring of retinal function and correlation with morphological and psychophysical findings was at least in part possible in patients suffering from AMD and myopia. In all of four patients whose subfoveal CNV was documented by fluorescein angiography. Response densities were reduced particularly in the central 5 degrees and in visual acuity. The mfERG data showed a moderate to high statistical correlation with visual function as measured by visual acuity. On the other hand, the greatest linear dimension of the lesion size showed only a weak to moderate statistical correlation with both the response densities of the mfERG and the visual acuity. We conclude that the size of the CNV complex does not represent an accurate measure of retinal function in neovascular maculopathy. The good correlation of the mfERG data with visual acuity suggests that it may serve for objective assessment of retinal function, of the areas overlying the CNV. It shows potential as a valuable tool for longitudinal monitoring of AMD patients.

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